

WHAT IS CLAIMED IS:

1. A rechargeable lithium battery which comprises a battery main body comprising at least a cathode, an anode, and an ion conductor enclosed between a pair of a sealing member (a) and a sealing member (b), at least said sealing member (a) having a concave portion such that said concave portion is extended to either side of said sealing member (a) from a central position of said sealing member (a) so as to have a peripheral portion which surrounds said concave portion, and said two sealing members (a) and (b) being arranged to oppose to each other such that the face of said concave portion of said sealing member (a) is faced to said sealing member (b) through said battery main body, characterized in that said sealing member (a) has a peripheral collar portion (a-i) at said peripheral portion of said concaved portion and said sealing member (b) has a peripheral collar portion (b-i) at a region thereof corresponding to said peripheral portion of said sealing member (a) wherein said collar portion (a-i) and said collar portion (b-i) are mutually welded, and either said sealing member (a) or said sealing member (b) is provided with a power output terminal having an electrical continuity with said battery main body and an insulating portion for

insulating said power output terminal.

2. A rechargeable lithium battery according to
claim 1, wherein said sealing member (b) also have a
concave portion such that said concave portion is
5 extended to either side of said sealing member (b) from
a central position of said sealing member (b) so as
to have a peripheral portion which surrounds said
concave portion and said peripheral portion comprises
said collar portion (b-i).

10 3. A rechargeable lithium battery according to
claim 1, wherein each of said sealing member (a) and
said sealing member (b) principally comprises one or more
metallic materials selected from a group consisting of a
stainless steel material, a nickel material, a
15 nickel-plated iron material, an aluminum material, and a
copper material.

4. A rechargeable lithium battery according to
claim 1, wherein each of said collar portion (a-i) and
said collar portion (b-i) has a width in a range of from
20 0.5 mm to 3.0 mm.

5. A rechargeable lithium battery according to
claim 1, wherein said concave portion of said sealing
member (a) is shaped to have a cross section in a
substantially symmetrical trapezoidal form.

25 6. A rechargeable lithium battery according to

claim 5, wherein said symmetrical trapezoidal form as said concave portion has an inclination in a range of from 5° to 45°.

7. A rechargeable lithium battery according to
5 claim 2, wherein said concave portion of said sealing member (b) is shaped to have a cross section in a substantially symmetrical trapezoidal form.

8. A rechargeable lithium battery according to
10 claim 7, wherein said symmetrical trapezoidal form as said concave portion has an inclination in a range of from 5° to 45°.

9. A rechargeable lithium battery according to
15 claim 1, wherein said power output terminal includes a cathode power output terminal electrically connected to said cathode of said battery main body and an anode power output terminal electrically connected to said anode of said battery main body.

10. A rechargeable lithium battery according to
20 claim 9, wherein said cathode power output terminal and said anode power output terminal are situated at a position in said concave portion of said sealing member (a) which is 15 mm or less distant from a circumferential face said concave portion.

11. A rechargeable lithium battery according to
25 claim 1, wherein at least said sealing member (a) has a

region constituted by a plastic material.

12. A rechargeable lithium battery according to claim 1, wherein said sealing member (a) or said sealing member (b) has an internal pressure release vent.

5 13. A rechargeable lithium battery according to claim 1, wherein said internal pressure release vent comprises a plug comprising a thin film, a rubber plug or a spring.

10 14. A rechargeable lithium battery according to claim 1, wherein an internal pressure release vent is provided in said insulating portion.

15 15. A rechargeable lithium battery according to claim 1, wherein said insulating portion comprises a plastic material.

16. A rechargeable lithium battery according to claim 1, wherein said insulating portion comprises a plastic material, an internal pressure release vent is provided in said insulating portion, and said internal pressure release vent comprises a plug comprising a thin film formed of said plastic material constituting said insulating portion.

20 25 17. A rechargeable lithium battery according to claim 1, wherein said power output terminal includes a cathode power output terminal electrically connected to said cathode of said battery main body and an anode

power output terminal electrically connected to said anode of said battery main body, at least said cathode has a cathode lead portion, and said cathode power output terminal is joined with said cathode lead portion through
5 a cathode power output lead comprising a clad material.

M&P 18. A rechargeable lithium battery according to claim 17, wherein said clad material comprises a material selected from a group consisting of a nickel material, a titanium material or a copper material, or a material containing an element constituting said cathode power output terminal as a main constituent, and a material containing an element constituting said cathode lead portion as a main constituent.

19. A rechargeable lithium battery according to claim 1, wherein said anode of said battery main body has an anode active material containing a material capable of being alloyed with lithium.

20. A process for producing a rechargeable lithium battery, comprising the steps of:

20 providing a battery main body comprising at least a cathode, an anode, and an ion conductor, a first sealing member (a) having a concave portion with a peripheral portion surrounding said concave portion and a peripheral collar portion (a-i) at said
25 peripheral portion of said concave portion, and a

second sealing member (b) having a peripheral collar portion (b-i) at a region thereof which is corresponding to said peripheral portion of said first sealing member (a).

5 arranging said battery main body in said concave portion of said first sealing member (a),

10 mating said first sealing member (a) with said second sealing member (b) to oppose to each other such that the face of said concave portion of said first sealing member (a) is faced to said second sealing member (b) through said battery main body, and

mutually welding said collar portion (a-i) of said first sealing member (a) and said collar portion (b-i) of said second sealing member (b).

15 21. The process according to claim 20, wherein as said second sealing member (b), there is used a sealing member having a concave portion with a peripheral portion surrounding said concave portion and a peripheral collar portion at said peripheral portion
20 of said concave portion.

22. The process according to claim 20 which includes a step of arranging a power output terminal comprising a cathode power output terminal and an anode power output terminal having an electrical continuity
25 with said battery main body and an insulating portion

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for insulating said power output terminal in said concave portion of said sealing member (a).

23. The process according to claim 20, wherein to mutually weld said peripheral collar portion (a-i) and said peripheral collar portion (b-i) is conducted by way of laser beam welding, electron beam welding, resistance welding, or ultrasonic welding.

24. The process according to claim 22, wherein
said insulating portion is arranged to cover a
circumference of said power output terminal, a
metallic portion is arranged to circumscribe said
insulating portion, and said metallic portion is fixed
to said first sealing member (a) by way of welding.

25. The process according to claim 22, wherein
15 said insulating portion is formed to integrate with
said cathode power output terminal and said anode
power output.